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(54) Computer board game

(57) A computer board game comprises a board (12) coupled to a computer terminal (14) which can monitor and record the position of playing pieces (22) on the surface of the board.

The board can represent physical terrain in the form of a map or numerical patterns for use in educational display board or the base layer of three dimensional representations for weather or aircraft simulations.

The computer is programmed to establish the physical parameters of the piece of ground, water, air to be simulated and the factors such as weather which effect that simulation with time. The computer is also programmed with the rules governing the free action of "players" within the simulation. Players can play against the computer or can play against each other via the computer.

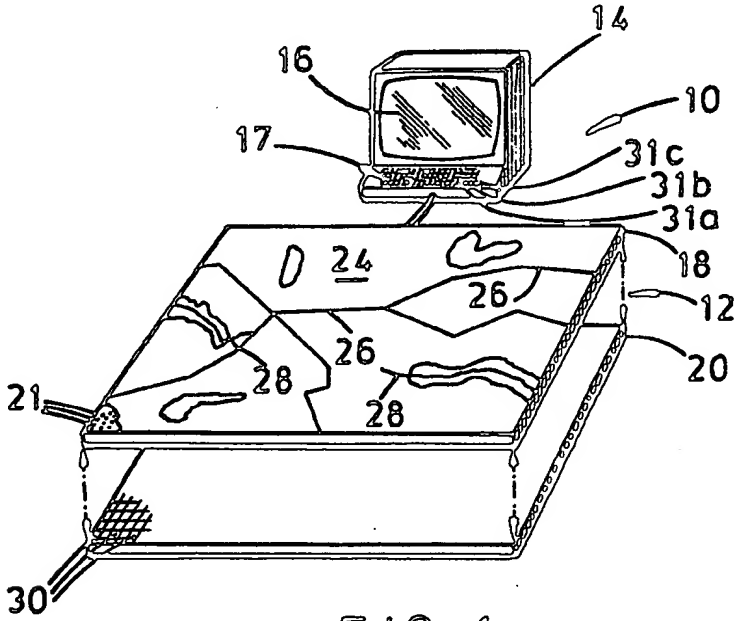

FIG. 1

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

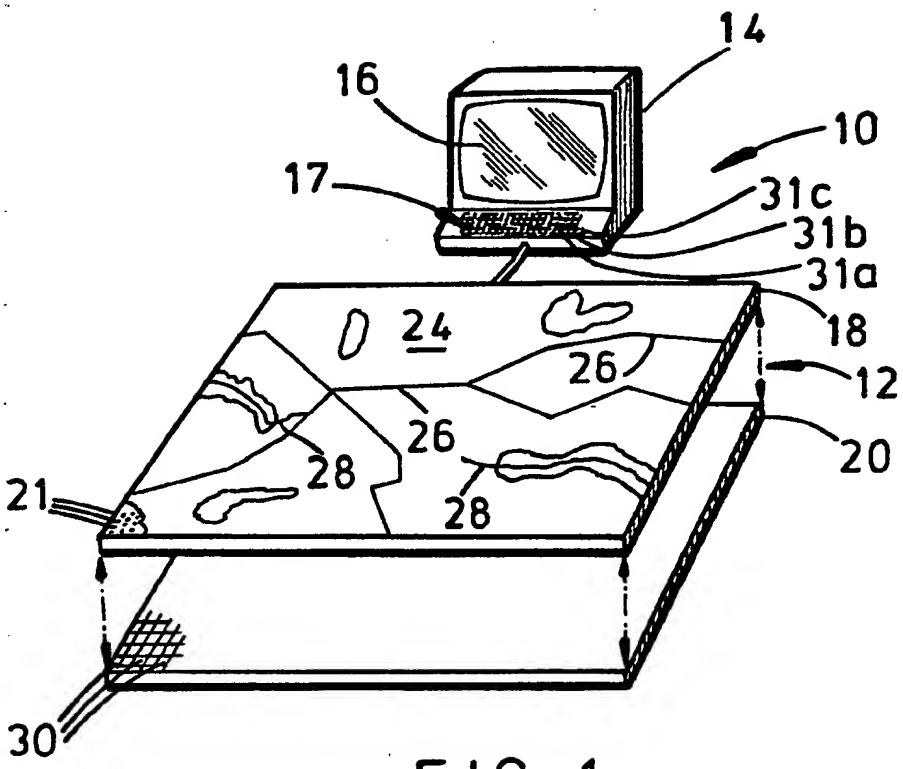

FIG. 1

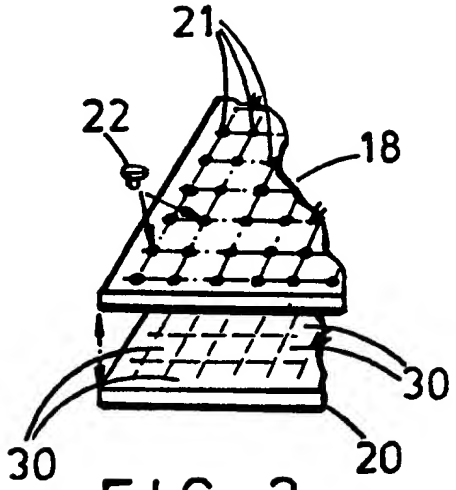

FIG. 2

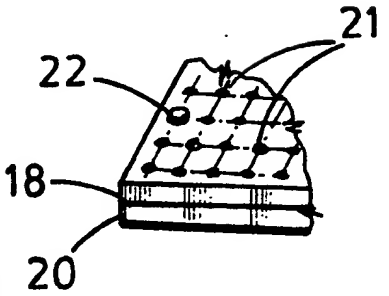

FIG. 3

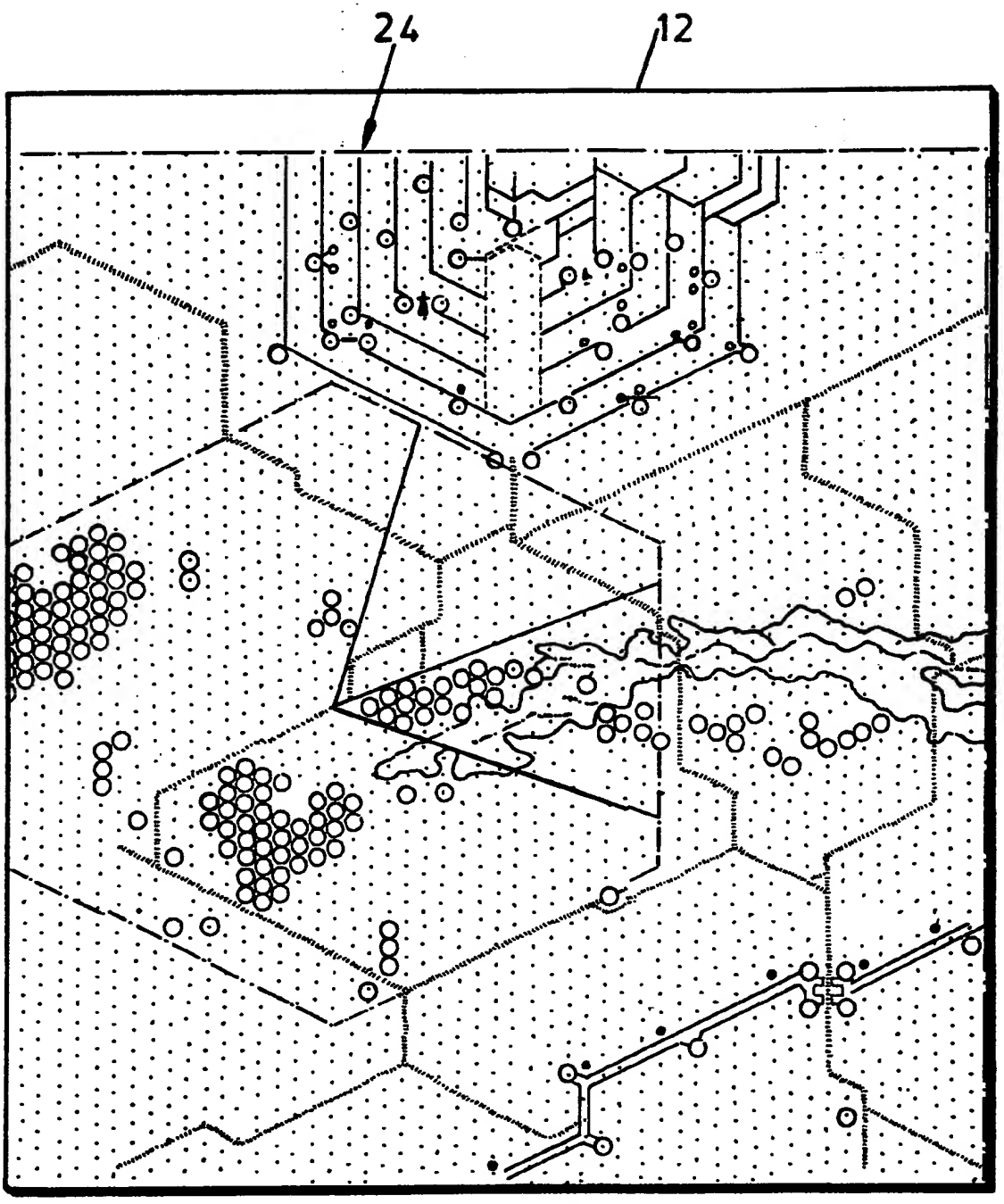

FIG. 4

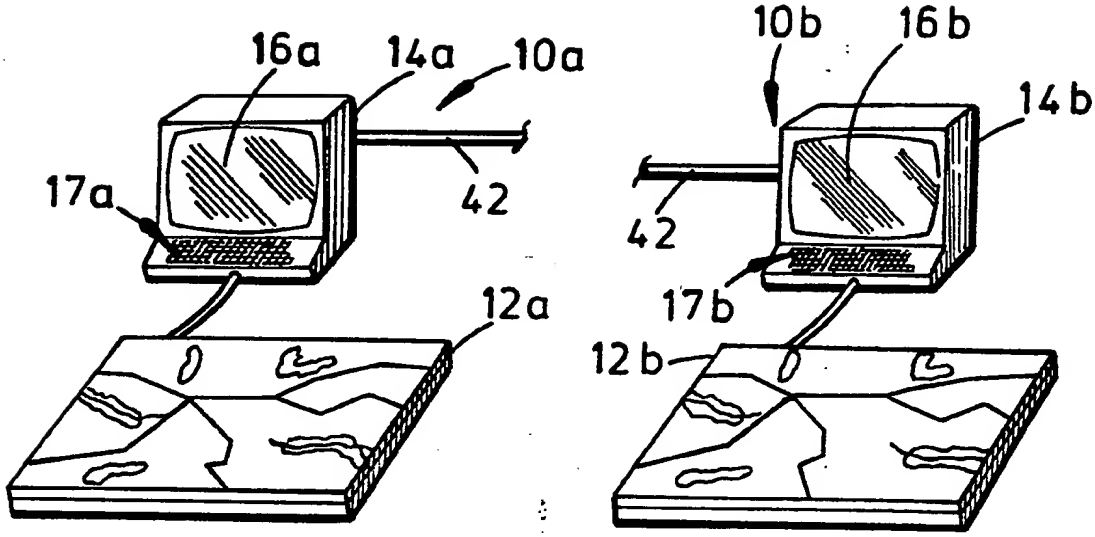

FIG. 5

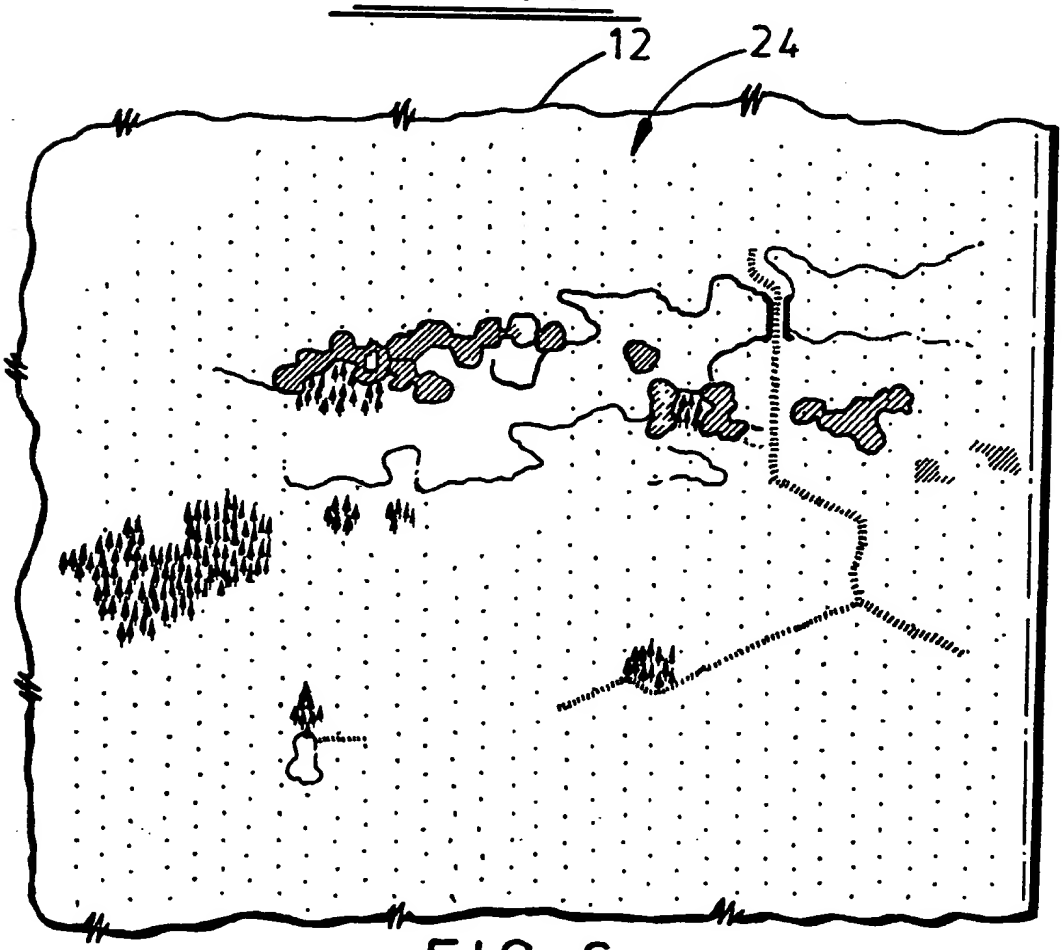

FIG. 6

COMPUTER BOARD GAME

The present invention relates to a board which is capable of interacting with specially written computer software to provide simulations of various kinds, and particularly but not exclusively a computer board game for one or more players each of whom has a set of playing pieces.

The features and system of operation of the invention are hereafter described to indicate their application in the design of a computer board game, upon the basis that the design principles and the engineering systems are common to the use of a game board, a display board or a simulation board. Any game is the simulation of a reality wich is governed by established rules. The board, when used for games, permits the establishment of highly complex rules without those rules being necessarily known in detail by the players.

A successful game is one which should be easy to play and readily understood. This can be achieved either by designing a very simple game, for example Monopoly (RTM) or Trivial Pursuit (RTM), or by designing a complex game in such a way that the complicated rules governing the play are easily found through using a simplified form of rules. In the latter case, the need to make the rules comprehensible places a practical limit upon the complexity of the game. There are people who are willing to go to extreme lengths to achieve exactitude in gaming but such people are in a minority.

Electronic games are currently of two forms. The first type is the video game - played upon games or business machines in which the entire game is played on the video monitor using a movable controller such as a joy stick or a trackball to control the computer program. This form of game is played almost entirely by juveniles. The second form of electronic game are generally chess games. The game is played upon a board having a mechanism which contains switches for sensing the positions of games pieces and software to control the game itself. In this form the player can challenge the computer to a game of chess. An individual player cannot play another human player or group of players.

It is desirable to provide a computer-based board game in which a player can play either against the computer or against another player or players who may be in the same room or at a remote location.

To make any game as easily playable as possible, it is desirable to simplify the use of complex rules to enable the players to concentrate on the object of the game or upon the simulation.

It is an object of the present invention to provide a board for interacting with computer software to provide simulations and a computerised board game which fulfills at least one of the aforementioned criteria.

This is achieved by providing a board coupled to a computer terminal which can monitor and record the position of playing pieces on the surface of the board.

The board represents a means of communicating simply with the computer software, thereby avoiding the need to understand computer technology or the manipulation of a comupter keyboard. The software allows the simulation of any number of different conditions to be established on the board, these conditions being physical or numerical. Thus the board can represent physical terrain in the from of a map or numerical patterns for use in educational display board or the base layer of three dimensional representations for weather or aircraft simulations.

The computer is programmed to establish the physical parameters of the piece of ground, water, air to be simulated and the factors such as weather which effect that simulation with time. The computer is also programmed with the rules governing the free action of "players" within the simulation. Players can play against the computer or can play against each other via the computer.

In one embodiment of the present invention the playing surface is provided by a laminated board, having an upper layer with a grid of holes for receiving the playing pieces. The lower layer is a two dimensional contact sensor device and when a playing piece is inserted into a hole, the piece presses against the contact sensor device which is calibrated so that the position of the playing piece inserted into that particular hole can be identified and monitored. The processing unit has a visual display unit (VDU) and a three button information input device

whereby the players may interact with the processing unit during the playing of the game.

According to a first aspect of the present invention there is provided a computer board game for one or more players said board game comprising a board for providing a playing surface for the game, at least two sets of playing pieces, each set having a plurality of playing pieces, for being disposed on said board, a computer processing unit coupled to said board and having, means for sensing the position of each of the playing pieces on the board, a memory for storing the position of each of the playing pieces and for storing a program of the rules of the game, and a visual display unit for displaying information of the game to the players and visual messages to the players, and data input means coupled to said processing unit whereby at least one of the players can interact with said processing unit.

Preferably said board has two layers; an upper layer having a plurality of apertures for receiving one playing piece and the lower layer in the form of a contact sensor device which is contacted by a piece disposed in an aperture and which is calibrated to identify the postion of each playing piece inserted to an aperture.

Alternatively, said means for sensing the position of said playing pieces is provided by a grid of pneumatic lines disposed below said board, the air flow through a specific pair of lines being blocked when a playing piece is inserted into a specific aperture on the board.

Preferably also the surface of said board is marked to

represent specific forms of terrain on the playingsurface, the computer program stored in said memory having a corresponding record of the terrain at each specific location on said board.

A plurality of boards are provided, one for each player, each board having a computer processing unit coupled thereto, each of said computer processing units being coupled to each other by a communication channel which is conveniently a telephone line. Conveniently the memory of each of said computers may store information relating to the position on the board of all of the playing pieces of the game.

According to a second aspect of the present invention there is provided a communications system for a computer board game to be played remotely by two or more players, said communications system comprising two or more remote stations coupled by a communications line, each of said stations having a board which provides a playing surface for the game and a computer processing unit coupled to said board and to said communications line, each of said processing units having means for sensing the position of the playing pieces on its own surface, and having a memory for storing a program of the rules of the game and for storing the position of all the playing pieces on all of the boards, and each of said processing units also having a visual display unit for displaying information relating to the game to the players and visual messages to the players and information input means whereby each of

the players may interact with their respective processing units.

Preferably said communication line is a telephone line. Conveniently each of said processing units has a MODEM associated therewith whereby said processing units may be coupled to each other through said telephone line.

According to yet another aspect of the present invention there is provided a board for interacting with software to produce simulations in which the position of pieces on the board have to be identified, said board comprising an upper layer having a matrix of through apertures for receiving part of a playing piece located on said board and a lower layer consisting of a laminated contact sensor device which is calibrated to identify the position of each point of contact on its surface, the lower layer being disposed next to the upper layer so that each playing piece inserted in an aperture contacts the lower layer, the board being connectable to a computer processing unit for identifying and monitoring the position of each piece disposed on the board.

Preferably the board is for use with a computer game in which the pieces are playing pieces which are moved in accordance with rules to provide a game simulation.

These and other aspects of the present invention will become apparent from the following description when taken in combination with the accompanying drawings in which:-

Fig. 1 is an exploded perspective view of a computer

board game in accordance with an embodiment of the present invention;

Fig. 2 is an exploded perspective view of part of the board shown in Fig. 1 drawn to a larger scale;

Fig. 3 is an assembled perspective view of the part of the board shown in Fig. 2;

Fig. 4 is a detailed plan view of a board as shown in Fig. 1 showing an example of the topographical features which may be illustrated on the surface of the board;

Fig. 5 is a diagrammatic view of an alternative embodiment in which two separate computer game stations are coupled using a communications link; and

Fig. 6 is a plan view of part of the board shown in Fig. 4 drawn to a larger scale.

Reference is first made to Fig. 1 of the drawings which is an exploded perspective view of a computer board game generally indicated by reference numeral 10. The game 10 has a board 12 which provides a playing surface upon which a number of playing pieces may be disposed as will be described. A computer terminal or processing unit (CPU) 14 is connected to the board 12, the CPU 14 having a colour visual display unit 16 (VDU) and a keyboard 17 connected thereto. The structure and operation will be described for two players playing each other. Each player has a set of playing pieces to put on the board 12, and a player may move his own playing pieces around the board 12 one at a time, during his turn. The CPU 14 records the

position of each of the playing pieces and stores the position of all the playing pieces on the board in its memory. The rules of the game are contained in a program also stored in the memory. As the game is played each player interacts with the CPU 14 by means of the VDU 16 and keyboard 17 as will be described. The CPU 14 monitors and controls the playing of the game in accordance with the rules.

Reference is now made to Figs. 2 and 3 which shows that board 12 consists of two layers; upper layer 18 and a lower layer 20. The upper layer 18 has a pattern of holes 21 for receiving the peg of an individual playing piece 22.The pattern of holes has 120 holes along each side of the upper layer 18. Each of the holes 21 are approximately 6mm in diameter which is fractionally larger than the diameter of the pegs of each of the playing pieces 22. The surface 24 of upper layer 18 is marked to represent different forms of terrain. For example line 26 on the surface 24 represents a road and line 28 on surface 24 represents a river. The values for each point of the terrain are determined by the program at the start of the game. During the playing of the game the program may cause these values to change. For example, a hollow upon being flooded becomes a lake. The values applied to the board are different for each simulation or game. When a playing piece 22 is positioned in a specific hole, for example a hole on the surface 24 marked with the road 26,

this movement and position is read by the computer and stored in the memory.

The lower layer 20 of board 12 is made up by a 2-dimensional contact sensor device 30, disposed beneath upper layer 18. The contact sensor device is of a type in which normally separate conductive layers are forced into contact by a piece and the resistance path is used to provide calibrated electrical signals which identify the position of the playing piece. An example of this type of device is disclosed in British Patent Application No. 2132359 in the name of Michael A Enskat. When a playing piece is inserted into a hole 21, the peg of the playing piece 22 presses against the contact surface of the sensor device 30 causing opposite conductive surfaces to make contact and to provide a electrical signal which is transmitted to the CPU 14. The CPU 14 compares the signal with calibrated signals to identify the piece position and the CPU 14 stores this information in its memory as will be described.

As hereinbefore described, the program stored in the memory of the CPU 14 determines the rules of the game. This program runs until it reaches a stage at which the player whose turn it is to play has to decide if he intends to move or use another one of his playing pieces 22. If he intends to move a playing piece 22, he indicates this choice by lifting the piece 22 from its position on the board 12. The output signal of the

contact sensor device 30 below the hole from which the piece 22 has been removed changes, and this change of output signal is sensed by the CPU 14 providing the CPU 14 with an indication that this particular piece 22 is being moved. The CPU 14 opens a channel to the board 12 to indicate that the CPU is ready to accept the grid co-ordinates of the new position of the piece 22. When the piece is inserted into its destination hole, the contact sensor 30 below this hole 21 produces a signal which the CPU 14 processes to provide the grid co-ordinates of the new position of the piece 22. The program stored in the computer analyses these new co-ordinates in accordance with the rules of the game to determines if a 'legal' move has been made i.e. a move permitted by the rules of the game. A message is displayed on the VDU 16 if an 'illegal' move has been made and the piece 22 must be replaced in its original hole or moved to a destination hole which constitutes a 'legal' move. This process is repeated for the movement of each of the playing pieces 22.

The colour displayed on the screen of the VDU 16 provides an indication of the player who is 'in play' and who may move or use more of his playing pieces. Each player has his own screen colour and the VDU 16 displays each of the colours in sequence to instruct the players who are 'in play' at that particular time.

As also hereinbefore described an input keyboard 17 is

connected to the CPU 14. This keyboard uses three keys 31a, b, c mounted therein and these keys allow the players to communicate with the CPU 14. The three keys 31a, b and c represent the commands "yes", "no" and "continue" respectively. The program of the game runs until a player has to make a decision: for example, if two playing pieces are in a position where these pieces may be deemed to be in combat with each other, the CPU 14 may instruct VDU 16 to display a message such as "Do you want to fire at target X?" By pressing one of the keys on the keyboard 17 the player can provide an appropriate answer.

Changes in the values of terrain, playing piece positions and playing piece strengths occur continuously during the playing of the game. All such changes are saved on disc immediately the changes occur and are therefore irrevocable. If it is desirable to switch off the CPU 14 for any reason, the information in the memory of the CPU 14 when it was switched off may be re-input to the memory of the CPU 14 at a later date. This information would relate to the current state of play of the game, i.e. the position of all the pieces and various factors relating to the capabilities of these pieces as will be described later in detail.

Reference is now made to Fig. 4 of the drawings which is a plan view of the surface 24 of a board 12 showing an example of the topographical features which may be

represented on the board 12. This particular surface 24 is marked to represent the battlefield of the "siege of Minas Tirith" from the book "The Lord of the Rings" by J R R Tolkien. This is one example of how the surface 24 could be marked, however, this example will be used later to describe various features which may be incorporated into the program stored in the memory of the CPU 14. Three dimensional elements such as raised areas may be provided on the surface 24 to provide a more realistic three dimensional appearance. However, each three-dimensional element which can receive playing pieces is an extension of the two-dimensional contact surface and the position of a piece on the three-dimensional surface is determined in the same way.

Reference is now made to Fig. 5 of the drawings which is a diagrammatic view of an alternative embodiment in which two separate computer game stations are coupled by a communications link. Two remote stations 10a and 10b having associated boards 12a, 12b and computer processing units 14a and 14b similar to that hereinbefore described are coupled by modems over a telephone line 42. Both boards 12a and 12b are identical so that the same game may be played simultaneously or by each player in turn. Of course, each player (two in this case) has his own board and at the start of the game each player has only his own playing pieces disposed on his own board.

The CPU's 14a and 14b send messages to each other

over the telephone line so that both CPU's 14a and 14b have the positions of all the playing pieces stored in memory. The game is played in the manner hereinbefore described, each player taking his turn to move one piece at a time and interacting with his respective CPU 14a, 14b to ensure that 'legal' moves are made. However, when one of the playing pieces is moved to a position where that playing piece can 'see', as determined by the rules, one of the other player's pieces a message is displayed on the VDU 16a, 16b to indicate the position of the opposing player's piece.

Reference is again made to Fig. 4 of the drawings and also to Fig. 6 of the drawings which shows part of the surface 24 shown in Fig. 4 drawn to a larger scale. The "Siege of Minas Tirith" scenario is used as an example to illustrate how the software program stored in the memory of CPU 14 may be used to apply extensive and complicated rules for the game, some of which are based upon normal physical parameters and others of which introduce a fantasy element to the game. The CPU 14 monitors the observance of these rules and brings the rules to the attention of the players when appropriate.

The game is medieval scenario in which six separate armies engage in combat. The purpose of three of the armies is to capture the city of Minas Tirith by open warfare or by siege while the other three opposing armies

resist.

As far as is possible the movements permitted on the board 12 are governed by natural consideration such as climate, day and night etc. The individual armies in play, engage in movement, in activities and in combat. At all times play is controlled by the computer which instructs which player to play and controls the conditions of play.

Play starts with two of the armies on the board and the third attacking army appearing at the edge of the play area. The computer randomly brings the other armies onto the board and no player knows at what time they will appear in play.

The playing pieces of each of the armies represent various elements of the army for example infantry, cavalry, archers etc. Some playing pieces represent fantasy characters such as trolls, Orcs, magicians etc. As hereinbefore described, the CPU 14 monitors the progress of the game and also monitors and introduces various conditions such as weather which would affect the fighting capabilities of the various army elements.

For example an archer may fire with greater or less accuracy depending upon range, wind conditions, visibility (day or night), weather conditions (rain or dry), and the archer's success will be dictated by his own circumstances - static or moving, composed or under attack, rested or exhausted. Finally, his success will depend upon the

situation of his opponent -static or mobile, unprotected or armoured, behind wall or in the open.

The CPU 14 assesses all these factors continuously and gives the player only the result - in this case of the archery attack. At different times the CPU 14 informs the players of weather conditions, the conditions of troops etc, but in such a way that the information is applied generally not specifically to a single action. The three-dimensional nature of the board allows many of these factors to be assessed visually. This allows players to concentrate upon the strategic considerations of the game and to leave the very mechanical aspects of the game to the computer.

Each player has a turn of play in each round and has four options during his turn:-

1. Activities: During which trenches may be dug, palisades built, troops rested, crossing barriers attempted, woods cut etc.

2. Movement: Movement across the board, governed by factors of terrain.

3. Combat: Infantry or cavalry attacks, archer attacks, attacks using siege engines and catapults or the pouring of hot oil.

4. Magic: In the Lord of the Rings there are two 'magical' characters. These characters have certain magical abilities which can be used during each round.

Each army has a different size and characteristic,

containing different elements of a medieval type army ie. cavalry, infantry, elephants, archers catapult crews, plus the addition of trolls and orcs. The two opposing sides have armies which have the same equivalent strength although the attacking army has twice as many pieces as the defenders, but each of half the strength. Were the two armies to meet upon a flat field then combat would reduce the number of both sides equally and the statistical probability is that both sides would destroy each other equally. The only way to win the game therefore is to use any factor of advantage which may increase the statistical odds of combat being successful.

When the game hereinbefore described is played by two or more players each having a remote board as described with reference to Fig. 5, the players do not know where the army units of other armies are located unless 'their' army unit can 'see' that unit. Thus, each player has his own pieces on his board and knows where they are exactly. As the player moves his pieces on the electronic board, the screen shows what that unit can see at that point. Thus, within the limit if visibility dictated by the computerised weather and other visibility conditions, the moving unit will see an enemy unit standing upon open ground. However, the moving unit will not 'see' an enemy unit standing behind a barrier such as a wood, a hill or a wall. If the unit in play is moved sideways to see round a barrier then the enemy unit will be revealed upon the

computer screen. Once the player has established an enemy unit position he marks its place on the board and its whereabouts, at that particular moment, is known. As the enemy unit moves in its turn, its position may be lost as will certainly happen after nightfall, or if its position is obscured by dust or smoke. However, certain of the armies can 'see' well at night but poorly during the day and others are the reverse. Therefore, only at dusk do all armies have similar 'seeing' ability.

This unique facility of this game allows ambushes and tactical surprise in a way impossible in other games.

The game incorporates innumerable other factors: rules for scaling walls, rules for bombardment, cavalry versus elephants etc. All of these rules are contained within the software and are not revealed to the player until such time as circumstances arise in which it is necessary for the player to know of their existence.

Other battle scenarios which may be re-enacted on a similar board include any medieval battle (for example Agincourt); First World War battles; Modern warfare battles; Napoleonic Warfare battles (e.g. Waterloo) and Air/Sea battles. All of these games would use the same basic rules but with different equipment, movement rates, armourments etc. With regard to the Air/Sea battle, a large board may be provided (for example 5000 holes) the playing pieces being provided to represent various ships, in the manner of "Battleships and Cruisers".

As the game progresses, the players attempt to find the opposing player's ships and to sink them. The electronic board permits a range of options impossible in traditional games viz ships can be moved around the board, aircraft can attack from aircraft carriers etc. It allows islands to obscure views, changed weather conditions, laying of smoke screens, different sea conditions, submerging submarines, damage affecting speed and combative ability, etc. In this way, the simple game of Battleships and Cruisers becomes 'The Battle of Midway'.

Various modifications may be made to the embodiments hereinbefore described without departing from the scope of the present invention. The contact sensor devices disposed below the holes of the upper layer of the board may be replaced by a grid structure of air flow conduits. When a playing piece is inserted into one of the holes, air flow through two of the conduits is blocked providing a grid reference co-ordinate of the new position of the playing piece. Alternatively the grid of holes may be aligned with two rows of push buttons disposed along the co-ordinate axes of the board whereby the co-ordinate destination of the playing piece may be manually input to the CPU. The grid of holes may have any suitable number of holes, for example 5000 holes for the air/sea battle simulation with the number of holes being dictated by the convenient size of board. The three-dimensional elements which provide the raised areas of the board may be moved

around the board to change the terrain represented on the board surface. However, a movable three-dimensional element would have a projection portion disposed in its hole so that when a playing piece is inserted into the hole, the projection portion presses against the contact sensor device disposed in the lower layer of the board.The keyboard may be replaced by a hand-held push button key pad having the three buttons which are used to provide the 'yes', 'no' and 'continue' commands

Any number of boards and associated CPU's may be connected by communication lines to allow the game to be played out simultaneously on each of the boards. The VDU need not be a colour VDU although it is understood that a colour VDU is preferred. The VDU may be replaced by an audio card and loudspeaker whereby the instructions to the players during the game may be spoken rather than displayed on the VDU screen. A printer connected to the CPU may be used to generate hard copy reports on the current state of play, for example maps of current positions may be printed together with tables of information about the current state of play. It is possible that existing board games could be adpated so that these games could be played on the boards hereinbefore described. Other activities such as educational aids could be adapted for use on such board.

An advantage of the present invention is that an individual player of the game can play against the

computer or against any number of other players.

Although the software must be specifically designed for use with the board, this software may be adapted for use with almost all of the existing range of personal and business computers. The computer allows the game to have extensive and complicated rules while still being relatively easy to play. The computer monitors the progress of the game and only brings up the rules of the game when appropriate in the circumstances of play during the game.